

AMENDMENT UNDER 37 C.F.R. §  
U.S. APPLN. NO. 10/924,872

**AMENDMENTS TO THE CLAIMS**

**This listing of claims will replace all prior versions and listings of claims in the application:**

**LISTING OF CLAIMS:**

1. (Withdrawn): A method of depositing a silicon carbide on a substrate from a vapor phase or a liquid phase, comprising the steps of:

depositing a silicon layer on the substrate;

doping the silicon layer with an impurity composed of at least one element selected from a group consisting of N, B, Al, Ga, In, P, As, Sb, Se, Zn, O, Au, V, Er, Ge, and Fe, to form a doped silicon layer; and

carbonizing the doped silicon layer into a silicon carbide layer of the silicon carbide doped with the impurity.

2. (Withdrawn): A method as claimed in claim 1, wherein the silicon layer depositing step, the doping step, and the carbonizing step are carried out during epitaxially growing a thin film on the substrate by the use of a chemical vapor deposition technique;

the silicon layer deposition step being carried out by using a gas of a silane group or a dichlorosilane group as a silicon raw material while the carbonizing step is carried out by the use of an unsaturated carbohydrate gas.

AMENDMENT UNDER 37 C.F.R. §  
U.S. APPLN. NO. 10/924,872

3. (Withdrawn): A method as claimed in claim 1, wherein the silicon layer depositing step is followed by the doping step and the carbonizing step is carried out after the doping step.
4. (Withdrawn): A method as claimed in claim 1, wherein the silicon layer depositing step and the doping step are simultaneously carried out and are followed by the carbonizing step.
5. (Withdrawn): A method as claimed in claim 1, wherein the silicon layer depositing step and the doping step are simultaneously carried out while the carbonizing step is carried out when a predetermined time lapses after the start of both the silicon depositing and the doping steps.
6. (Withdrawn): A method as claimed in claim 1, wherein the silicon carbide layer doped with the impurity is deposited to a desired thickness by repeating a process unit composed of the silicon depositing step, the doping step, and the carbonizing step a plurality of times.
7. (Withdrawn): A method as claimed in claim 6, wherein an amount of impurity is varied during each doping step of the unit processes to provide a plurality of silicon carbide layers which have different impurity concentrations in a thickness direction, respectively.
8. (Withdrawn): A method as claimed in claim 1, wherein the doping step controls an amount of impurity so that impurity concentrations in the silicon carbide fall within a range between  $1 \times 10^{13} / \text{cm}^3$  to  $1 \times 10^{21} / \text{cm}^3$ .

AMENDMENT UNDER 37 C.F.R. §  
U.S. APPLN. NO. 10/924,872

9. (Withdrawn): A method as claimed in claim 1, wherein the doping step controls an amount of impurity so that an impurity concentration gradient falls within a range between  $10 \times 10^{18}/\text{cm}^4$  and  $4 \times 10^{24}/\text{cm}^4$  in a thickness direction of the silicon carbide layer.

10. (Withdrawn): A method as claimed in claim 1, wherein the substrate has a surface which is structured by either one of a single crystal silicon, a silicon carbide of a cubic system, and a silicon carbide of a hexagonal system while the silicon carbide layer deposited on the surface of the substrate is structured by silicon carbide of a cubic system or a hexagonal system.

11. (Withdrawn): A method as claimed in claim 1, further comprising the step of:  
removing the substrate from the silicon carbide layer after the formation of the doped silicon carbide, to leave a silicon carbide wafer.

12. (Withdrawn): A method as claimed in claim 6, wherein the doping step of each process unit is carried out by varying a species of the impurities from one to another at each process unit to provide a pn junction in the doped silicon carbide layer.

13. (Withdrawn): A method as claimed in claim 1, further comprising the step of:  
using, as a seed crystal, the doped silicon carbide obtained in claim 1; and  
further growing a silicon carbide on the seed crystal by a vapor deposition method, a sublimation re-crystallization method, or a liquid deposition method.

AMENDMENT UNDER 37 C.F.R. §  
U.S. APPLN. NO. 10/924,872

14. (Previously Presented): A silicon carbide having a region which has an impurity concentration gradient between  $1 \times 10^{22}/\text{cm}^4$  and  $4 \times 10^{24}/\text{cm}^4$  in the thickness direction, said silicon carbide being manufactured by the method comprising:

depositing silicon from a vapor phase or a liquid phase onto a substrate and forming a silicon layer on the substrate;

doping the silicon layer with an impurity composed of at least one element selected from a group consisting of N, B, Al, Ga, In, P, As, Sb, Se, Zn, O, Au, V, Er, Ge, and Fe, to form a doped silicon layer; and  
carbonizing the doped silicon layer into a silicon carbide layer of the silicon carbide doped with the impurity.

15. (Previously Presented): A semiconductor device comprising a silicon carbide layer, said silicon carbide being manufactured by the method comprising:

depositing silicon from a vapor phase or a liquid phase onto a substrate and forming a silicon layer on the substrate;

doping the silicon layer with an impurity composed of at least one element selected from a group consisting of N, B, Al, Ga, In, P, As, Sb, Se, Zn, O, Au, V, Er, Ge, and Fe, to form a doped silicon layer; and

carbonizing the doped silicon layer into a silicon carbide layer of the silicon carbide doped with the impurity.

16. (Original): A semiconductor device structured by the silicon carbide claimed in claim 14.

AMENDMENT UNDER 37 C.F.R. §  
U.S. APPLN. NO. 10/924,872

17. A method of depositing a silicon carbide doped with an impurity, comprising the steps of: doping the impurity into a silicon to form a doped silicon; and carbonizing, after the doping, the doped silicon into the silicon carbide.

18. A method as claimed in claim 17, further comprising the step of preparing an undoped silicon prior to the doping step.

19. A method as claimed in claim 17, wherein the impurity is composed of at least one element selected from a group consisting of N, B, Al, Ga, In, P, As, Sb, Se, Zn, O, Au, V, Er, Ge, and Fe.